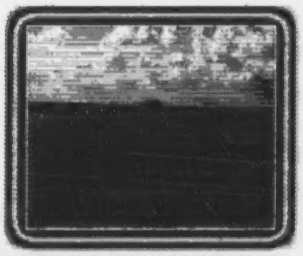
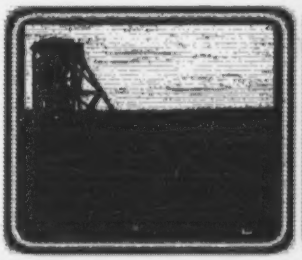
JUNE 15-16, 2009 TREE OF PEACE YELLOWKNIFE, NT

CONFERENCE REPORT

NWT WATER RESOURCES STEWARDSHIP

PREPARED FOR INDIAN AND NORTHERN AFFAIRS CANADA AND THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES, GNWT





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ACRONYMS

AEMP	Aquatic Environmental Monitoring Program
CCME	Canadian Council of Ministers of the Environment
CIMP	Cumulative Impacts Monitoring Program
ENGOs	Environmental Non-government Organizations
GBLWMP	Great Bear Lake Water Management Plan
GNWT	Government of the Northwest Territories
INAC	Indian and Northern Affairs Canada
MWWE	Municipal Waste Water Effluent
NRWG	Northern Research Working Group
NT	Northwest Territories
OPA	Ontario Power Authority
PAS	NWT Protected Areas Strategy
SCN	Science in the Changing North
SLUP	Sahtu Land Use Plan
TK	Traditional Knowledge
WLWB	Wek'èezhìi Land and Water Board

EXECUTIVE SUMMARY

The fifth annual *Science in the Changing North (*SCN) was held in Yellowknife on June 15-16, 2009. Sponsored by the Department of Environment and Natural Resources (ENR/GNWT) and Indian and Northern Affairs Canada (INAC), the event was an opportunity to bring together scientists, decision-makers, members of Aboriginal communities, and ENGO stakeholders. The focus of the 2009 gathering was on the stewardship of NWT water resources, building on the work in past years on traditional knowledge and community monitoring. The emphasis on water resources coincides with the development of the NWT Water Stewardship Strategy, a collaborative effort between GNWT, INAC and other partners that is intended to assist water stewards as well as to support bilateral transboundary negotiations under the auspices of the Mackenzie River Basin Board (MRBB). SCN built upon other recent water-related events including resolutions from Aboriginal assemblies, the *Keepers of the Water* gatherings, and the *WaterWise* gathering in November 2007.

The purpose of the two-day gathering was to share ideas on moving forward as water managers and stewards. Participants were to come away from the gathering with a better understanding of the evolving NWT Water Stewardship Strategy, This included discussion of the factors that are influencing water stewardship both now and in the future, and the role of scientific and Traditional knowledge in supporting water management actions.

Science in the Changing North 2009 provided a forum for invited speakers and participants to share their knowledge of water-related science and its use in the stewardship of this vital resource. More than 100 invited participants attended the event. These included federal and territorial water managers, provincial water managers, members of the NWT Water Stewardship Strategy Aboriginal Steering Committee, members of communities and regional Aboriginal organizations, Northern regulatory boards and agencies, ENGOs, and members of the scientific community involved in water resources stewardship activities.

Over the course of the two days, presentations, discussion and four poster presentations contributed to the four SCN themes, as summarized below.

Day 1: Welcome and Introductory Remarks

- Opening remarks were made by J. Michael Miltenberger, NWT Minister of the Environment and Natural Resources.. Minister Miltenberger welcomed participants and gave a brief overview of the work done to date in preparing for the NWT Water Stewardship Strategy.
- Keynote speaker Joanie McGuffin provided a thought-provoking and dramatic photographic journey of her canoe trip on the George River from Indian House Lake to Ungava Bay.

Day 1: Session 1 – Overview and Status of the Development of the NWT Water Stewardship Strategy

- Attendees were given an overview by INAC and GNWT of the process for the development of the NWT Water Stewardship Strategy. Mark Warren and Aiyana Lajeunesse of ENR-GNWT described its context, such as providing a Northern voice for water stewardship and assisting in transboundary water negotiations. Also discussed were the recent an ongoing engagement exercises intended to develop the Strategy, including *Science in the Changing North 2009* and a recent review by the Rosenberg Forum. Important components discussed included the emphasis on the needs and values associated with water (e.g. human, ecosystem, cultural/spiritual, economic). David Livingstone of INAC described the relationship of the Strategy to the NWT Environmental Stewardship Framework. The opportunity exists for the NWT to set the standard for the stewardship of water resources for the rest of Canada.
- An explanation of natural capital accounting was provided by Dr. Peter Victor of York University. This method of conceptualizing natural resources is being explored in the evolving NWT Water Stewardship Strategy. By considering water resources as ecological goods and services, a fuller understanding of the costs and benefits of water use can occur. While some disagree with the notion of treating water as a commodity, expressing it as such provides another tool to decision-makers to assess the costs of actions and the value of ecosystems (rather than single resources). Lastly, there are a number of considerations that can be brought into the discussion without resorting to traditional dollar-value expressions of economics.
- A brief overview of the activities of the Mackenzie River Basin Board (MRBB) was provided by Trish Merrithew-Mercredi of INAC - NWT Region. The MRBB is preparing a second State of the Aquatic Environment Report (SOAER) which is expected in late 2009, focusing on TK and science in regards to climate change, the oil sands and hydro development. A steering committee was formed to address TK and to strengthen the

involvement of Aboriginal peoples in the MRBB; this committee is currently overseeing a literature review for the basin that is helping to inform the SOAER. The MRBB is also continuing work on a hydrological model of the Mackenzie Basin. Progress on bilateral water management agreements among MRBB members has been slow but two are currently in progress (BC/AB and AB/NWT). The Alberta-NWT agreement is expected in 2012 and 15 water management agreements may be in place at some point in the future. Ms. Merrithew-Mercredi noted that the recent Rosenberg Forum discussed the pace of negotiations and the MRBB will review their recommendations. Finally, Ms. Merrithew-Mercredi discussed the relationship of the NWT Water Stewardship Strategy to the MRBB and noted the importance of identifying a common, unified Northern vision for water stewardship. This will improve the position of the NWT in negotiations and provide a more inclusive approach for engaging Aboriginal people, governments and stakeholders. Accordingly the MRBB is designing a guidance document that will help guide negotiations. It is intended that the key principles of the NWT Water Stewardship Strategy will be captured in this document.

- There was a discussion of the principles of Integrated Water Management (IWM) led by Dr. Dan Shrubsole of the University of Western Ontario. Dr. Shrubsole discussed options for designing and implementing a resource stewardship strategy. IWM is a process of coordinated management that considers economic and social welfare without compromising ecosystem sustainability. An ecosystem-based approach can cover a range of scales from local to strategic, but its principal focus is on achieving outcomes. It can be integrated at higher levels (e.g., land, air) with sustainable development as an order higher yet. No one approach is ideal, and the NWT Water Stewardship Strategy could incorporate elements of each. He explained the much of the world operates locally, focusing on a single resource; local governments will be an important part of implementing an NWT plan. Discussing options for designing a water stewardship strategy, he outlined three levels of Integrated Management Plans that can be written: normative, strategic and operational. The proposed NWT Water Stewardship is outwardly a normative plan that includes quality of life values for an entire population. Finally, Dr. Shrubsole made specific recommendations regarding integrating reporting mechanisms and carefully considering the nature and scope of consultation. For example, a water

> "I encourage you to think boldly and to challenge the current system to achieve your water management needs."
>
> **– Dr. Dan Shrubsole**

resource strategy should discuss quality, quantity and in-stream flow, all in the same document.

Day 1: Session 2 – Current and Emerging Trends in Water Science and Stewardship

- A description of monitoring in NWT water licensing was provided by Dr. Kathy Racher of the Wek'èezhìi Land and Water Board (WLWB). The discussion covered various types of water-related monitoring programs, their role in water management, and the experience of the WLWB and its plans with respect to monitoring. Perspectives on how monitoring and needs of regulators could be addressed in the Water Stewardship Strategy were also presented. Water licenses contain rules for controlling waste and its release into the environment. A license is required if there might be an effect to the downstream water users, the conditions of which control the use of that water. Dr. Racher stated that there is a considerable amount of research specific to northern environments that can be shared with the Strategy and its partners, and the WLWB has experience in integrated resource management. She agreed that there is a need to initially define a common vision and guiding principles on how water is valued in the NWT, followed by the development of water quality objectives. Developing and maintaining a forum for shared decision making with respect to water will benefit all northerners.
- The role of Traditional Knowledge in aquatic environment monitoring programs (AEMPs) was described by Carole Mills of INAC. Ms. Mills stated that including Aboriginal Peoples and communities in all aspects of a program will increase trust, respect and understanding. She discussed the roles of science and TK and what they can bring to monitoring programs, and provided examples of successful uses in aquatic effects monitoring. Ms. Mills also made some suggestions for how TK can be used in shaping the NWT Water Stewardship Strategy. She explained the similarities to western science in that it is holistic, verifiable, repeatable and peer reviewed. Accessing this information requires resources, money, time and people to collect it. She reinforced the idea that TK is proprietary intellectual property, and the rights to it are owned by the people who have it. The NWT Water Stewardship Strategy should recognize that TK is different in each area and sometimes in each community, and the source of the TK (including the individual elder or harvester) must be appropriate. In this context, TK is not just another source of knowledge or information. It also considers how to involve people and make decisions and it must be based on respect and understanding of the values of Aboriginal peoples. Ms. Mills concluded by offering guidelines to consider before beginning any aquatic effects monitoring program, and discussing options for communicating results to communities.

Day 2: Session 2 (continued)

- Dr. Steve Kokelj of INAC and Dr. Michael English of Wilfrid Laurier University provided insights into the dynamics of delta environments. Deltas are areas of high biological productivity but can be sensitive indicators of environmental change. Dr. Kokelj focused on the Mackenzie Delta and emphasized the importance of local monitoring programs in assessing cumulative effects. Dr. English described the effects on the Slave Delta of changing water flow from sediment transport and vegetation succession.
- Anne Wilson of Environment Canada and Catherine Mallet of INAC described the activities of the Northern Research Working Group, whose work relates to the Canadian Council of Ministers of the Environment's recent strategy for wastewater management. Various cooperative initiatives are underway to help identify appropriate performance standards suited to Northern environments.
- Dr. Barrie Bonsal of Environment Canada discussed a range of observed and projected effects of climate change on water regimes. His presentation outlined a number of considerations for decision-makers in the areas of policy and sustainable development.

Day 2: Session 3 – Applying Information in Support of Water Management and Stewardship

- Mike Palmer of the Nature Conservancy described a developing freshwater classification of the Mackenzie Basin. This system relates to the NWT Protected Areas Strategy (NWT PAS), dividing watersheds into elements including catchment size, soil type and permafrost type. The result is similar to a land-cover classification scheme but focused on water resources. The system is intended to be used with protected areas and land use planning, and has potential applications in monitoring and habitat classification. Currently, a notable gap exists in groundwater data.
- Bob Overvold of the Sahtu Land Use Planning Board (SLUPB) gave an overview of trends in regional land use planning, focusing on the recently released draft of the Sahtu Land Use Plan. Mr. Overvold discussed the effort to integrate the Great Bear Lake Watershed Management Plan into the Land Use Plan.
- Ricki Hurst of Terriplan Consultants gave an update on the development of a geodatabase to support the NWT Water Stewardship Strategy. This database was introduced at the third multi-party workshop to develop the Strategy's approach to information management. Also discussed was work on a decision-support tool called WaterWise. It provides a transparent mechanism for examining actions and events in a watershed, using a basin segmentation method similar to the previous presentation on freshwater classification. The tool is intended to be available to all water users in a manner similar to the RECLAIM model used in mine closure calculations.

Day 2: Session 4 – Moving Forward Together as Water Managers and Stewards

- The second keynote speaker Joseph Boyden, presented a literary perspective on the importance of water in the north specifically, and in Canada in general. He also shared his experiences with the Waterkeeper movement in Northern Ontario.
- The gathering also featured a panel discussing Aboriginal perspectives on key 'take-home messages' from SCN. Panel members Tim Heron, Sonny Macdonald, Arthur Beck and Richard Binder provided input when asked 'What was one interesting idea or new piece of information your learned at SCN?', and made suggestions for what they think needs to be done in moving forward together as water stewards.
- A brief open forum for questions and comments followed before Michel Louis Rabesca provided the closing prayer.

1.0 INTRODUCTION

On June 15th and 16th 2009 the Department of Environment and Natural Resources (ENR/GNWT) and Indian and Northern Affairs Canada (INAC) sponsored the fifth annual *Science in the Changing North,* which was held in Yellowknife NT. The theme was *'NWT Water Resources Stewardship'*, a timely topic that built upon recent events such as resolutions from Aboriginal assemblies, the *Keepers of the Water* gatherings, and the November 2007 *'WaterWise – Mackenzie Basin Waters NWT Information Flow'*. This year's event marks a return to SCN's 'science roots', following last year's *Science in the Changing North* focus on 'Environmental Monitoring and Community Involvement- Walking the Talk' (which included a water component).

The purpose of *Science in the Changing North 2009* provided a forum for invited speakers and participants to share their knowledge of water-related science and its use in the stewardship of this vital resource. The objectives of the event were twofold:

1) To provide participants with a better understanding of:
   - The status of the development of the NWT Water Stewardship Strategy;
   - Emerging factors that are influencing water stewardship both now and in the future
   - Science and other knowledge that can be used in support of water management and stewardship; and
   - Application of information in support of water management and stewardship.

2) To share ideas on moving forward together as water managers and stewards.

Invited participants (See Appendix A) included representatives of federal and territorial water managers, provincial water managers, the NWT Water Stewardship Strategy Aboriginal Steering Committee, communities, regional Aboriginal organizations, Northern regulatory boards and agencies,, ENGOs, and members of the scientific community involved in water resources stewardship activities.

Over the course of the two days, a number of presentations, discussions and poster displays contributed to the four themes of Science in the Changing North. (See Appendix B – SCN Agenda, Appendix C – Posters, and Appendix D – Presentations).

Session 1: Overview & Status of the Development of the NWT Water Stewardship Strategy

Day 1 set the stage for informed discussion on the status of the NWT Water Stewardship Strategy, including perspectives from the Scientific and Traditional Knowledge community. Participants also heard details of work by the Mackenzie River Basin Board, options for developing a water strategy and details of Natural Capital Accounting and Integrated Water Management.

Session 2: Current and Emerging Trends in Water Science & Stewardship

Building on the foundation laid on earlier, this session explored a wide number of current and emerging trends in water science and stewardship. 'Natural capital' and examples of various water monitoring and management projects were explored. We also heard how climate change is impacting arctic waters and how the GNWT is planning to address this important issue.

Session 3: Applying Information in Support of Water Management and Stewardship

This session examined plans and programs that support water management and stewardship programs. Topics included freshwater classification, geodatabase applications, and land use planning.

Session 4: Moving Forward Together as Water Managers and Stewards

During the afternoon of Day 2, recommendations and actions for moving forward were identified, based on identified priorities, successes and 'lessons learned' in the NWT and elsewhere.

2.0 DAY 1

2.1 *DAY 1 WELCOME AND INTRODUCTORY REMARKS*

Following an opening prayer by Michel Louie Rabesca, a Tłı̨chǫ elder, participants were addressed by J. Michael Miltenberger, Minister of Environment and Natural Resources (Government of the Northwest Territories), who welcomed participants to the conference and made opening remarks.

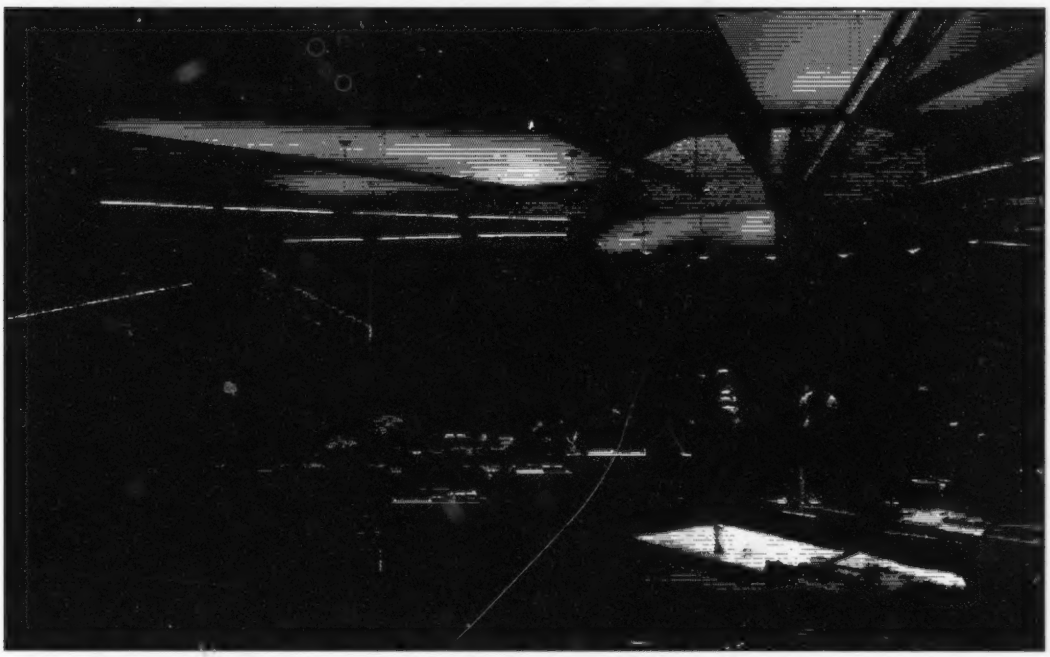

Figure 1: SCN Participants at the Tree of Peace Friendship Centre

2.1.1 Michael Miltenberger – Minister of Environment and Natural Resources *OPENING REMARKS*

Minister Miltenberger noted how much has been accomplished in the past year with regard to moving forward with the NWT Water Strategy. He mentioned that the third reading of the *Species at Risk Act* is coming forwards shortly, and the *NWT Wildlife Act* will be a critical piece of legislation that will be used collaboratively to help settle land claims. He committed to

completing changes to the Wildlife Act (which is currently being overhauled) using the same collaborative approach as SARA and the Water Stewardship Strategy within the next 800 days. Minister Miltenberger noted some of the accomplishments to date including the NWT's background document for the Strategy - *Northern Voice, Northern Waters*, which recognizes the critical role and value of TK and natural capital. It has attempted to address transboundary issues and other third party interests in a collaborative way. He emphasized that northerners have to be very clear about how to handle industrial development in the north, stating that "If we want to hold Alberta and Canada to our very high standards, then we have to hold ourselves to these high standards as well." The Rosenberg Forum, provided a peer review the previous week, and the GNWT and INAC will be pulling all the elements together, using the key steps and principles to create the best cutting edge water strategy that will be used to make all internal decisions, guide transboundary issues and encourage the federal government to follow through with a national water strategy. He closed by saying that he will be very interested in the feedback from this event.

"We can live without oil, but we can't live long without water"

2.1.2 Joanie McGuffin – Photographer, Journalist, Northern Adventurer
CANOEING WITH THE CARIBOU

Joanie McGuffin presented a dramatic photographic journey focusing on the her travels, including the Arctic/ subarctic portion of a Wilderness River Expedition Art Foundation (WREAF) journey on the George River from Indian House Lake to Ungava Bay, and photos of a project with the Innu in northern Labrador. Joanie shared insights from her journeys to the Boreal northern range, experiences with the caribou and the link between the Arctic and Lake Superior. Her slide show emphasized the connectedness of all things, particularly how all living things are reliant for their very survival on the health of the waterways that support them.

"It is the birthright of all human beings to have access to clean, fresh water"

2.2 *Session 1: Overview & Status of the Development of the NWT Water Stewardship Strategy*

2.2.1 Mark Warren, GNWT-ENR
David Livingstone, INAC
Aiyana Lajeunesse, GNWT- ENR
Northern Voices, Northern Waters – NWT Water Stewardship Strategy

Mark Warren began with a geo-political overview for the development of the NWT Water Stewardship Strategy. He described the environmental aspects of water stewardship in the NWT, noting that 60% of Canada's water drains north. The NWT has 42 distinct eco-regions, primarily made up of large undisturbed habitats that are very sensitive to change. The NWT Water Strategy is being developed in conjunction with an Aboriginal Steering Committee which is charged with taking into account the spiritual and social values of water and ensuring that Aboriginal and treaty rights are respected.

David Livingstone followed with a discussion of northerners' concerns, and what is being done now and what should be done in the future. He presented some background on the NWT Environmental Stewardship Framework (ESF) and explained how these interrelated plans, programs and processes can be used to set the context for responsible economic development. He noted that there is still a great deal of monitoring work to be done, and that we are all in this together. Everyone has a role to play, and should be prepared to do whatever it takes to get it right.

> "We will only get a working water strategy if all northerners are involved and have the opportunity to participate and implement it."
>
> **David Livingstone**

Aiyana Lajeunesse concluded the presentation by discussing the factors and collaborative processes that have shaped the development of the Water Strategy to date. She noted that there have been four workshops so far this year: Vision and Principles, Traditional Knowledge, Information Needs and Strengthening Relationships. The NWT Water Strategy principles include respect, sustainability, knowledge, adaptability, accountability, the precautionary principle, an ecosystem-based approach to watershed management, improving the use of best available knowledge, improving research capacity and a willingness to enhance interactions among water partners, with an emphasis on education and awareness. Ms. Lajeunesse noted that the Draft Water Strategy will be reviewed at workshop in August and public release is anticipated in the Fall of 2009 after being tabled in the Legislative Assembly. NWT and Alberta transboundary negotiations will then follow.

2.2.2 Peter Victor – Faculty of Environmental Studies, York University
NATURAL CAPITAL: A BRIDGE OVER TROUBLED WATERS

Dr. Peter Victor provided an overview of the concept of natural capital accounting, and the reasons why some people are interested in it as a means to organize information for water management and stewardship. He addressed contrary opinions that distrust economic modeling of nature. The valuation of ecological goods and services and its relation to natural capital was also reviewed. It was hoped that participants would then formulate their own positions and better understand the positions of others, especially with respect to whether and how natural capital can contribute to better decisions.

> "In order to calculate the value of natural capital, you need to have a good sense of what nature provides."

In order to calculate natural capital value, one must have a good idea of what nature provides. Most Western models of resource use treat natural resources as a stock-flow resource, such as seeing a forest primarily as a source of timber. It is also possible to view it as a fund-service with alternate and interconnected uses ranging from the ecological to the socio-cultural. Natural capital accounting examines ecological goods and services as similar to stocks or funds that yield a valuable flow of goods and services into the future. The value of natural ecological goods and services can increase over time, the development of a healthy ecosystem being likened to accumulating compound interest. This way of thinking results in a more holistic view of natural resources.

All methods of accounting have their detractors who argue that nature cannot be divided or commoditized. Natural capital accounting looks at larger-scale systems than other methods and examines ecosystems as whole systems. Ultimately there exist measures other than dollar value that can express the value of a resource such as water. Organizations such as Statistics Canada have established natural capital accounts to track the viability of continued resource use. Dr. Victor discussed other applications of the concept and emphasized a careful and conservative approach in assigning value to resources, so as to minimize the potential for overuse. Dr. Victor employed the metaphor of a bridge of assumptions that connect nature to natural capital. A number of assumptions previously made in accounting can be revisited, such as the perception of nature as an object or a subject, the degree to which ecological goods and services stand by themselves or are interconnected, and the relative weighting of individual and community values.

2.2.3 Trish Merrithew-Mercredi, Regional Director General – NWT Region, Indian and Northern Affairs Canada (INAC)/ Mackenzie River Basin Board

MACKENZIE RIVER BASIN BOARD – UPDATE: RECENT AND UPCOMING ACTIVITIES AND RELEVANCE TO NWT WATER STRATEGY

Ms. Merrithew-Mercredi provided a brief overview of the Mackenzie River Basin Board and its current and upcoming activities and initiatives, including an updated State of the Aquatic Environment Report (due in 2009) which will highlight work done on Traditional Knowledge, climate change, oil sands and hydro power. The Mackenzie Basin Hydrology Model predicts water flow based on multiple usages. It can be used to estimate impacts of increasing usage by industry and communities and climate change on the quality and quantity of the NWT's water resources.

The importance of bilateral agreements between jurisdictions and the inclusion of traditional knowledge, the participation of Aboriginal Peoples in the work of the Board and transboundary water management was also discussed. It was mentioned that the NWT has one bilateral water agreement signed with Yukon for the Peel River. Two others are in progress, one with BC and one with Alberta. There will be 13 bilateral agreements in place in the near future.

Ms. Merrithew-Mercredi also reviewed the future directions of the Board and its relevance to the NWT Water Stewardship Strategy. It was noted that the role of the Mackenzie River Basin Board is to evaluate the health of the Mackenzie River basin by investigating and collecting data, advocating for traditional knowledge and hosting workshops and committees that help educate northerners. They cannot enforce legislation, but must lead through education. The emerging issues Ms. Merrithew-Mercredi noted included the following:

- NWT Oil and gas development;
- Alberta oil sands;
- Hydro development;
- Mining;
- Nuclear power;
- Forestry;
- Agriculture; and
- Municipal water needs

Some of the qualitative water issues that are being taken into account include contaminants from industrial developments. A conceptual site model is under development to identify

potential and current contaminant sources. With regard to Traditional Knowledge, a steering committee has been formed to address TK and strengthen involvement of Aboriginal people. A literature review is underway for the entire basin, focusing on oil sands, hydro electric projects and climate change.

Regarding the NWT Water Stewardship Strategy, Ms. Merrithew-Mercredi noted that when complete, it will identify a common unified northern vision, highlight a framework that can be used for decision making, and provide a stronger position for the NWT in negotiating with other provincial, territorial and national governments in guiding bilateral water negotiations. This is a more inclusive participatory approach, and is the best practice for engaging aboriginal people, governments and other stakeholders. The NWT Water Stewardship Strategy and the MRBB contribute to the same overarching purpose, which is the integrated stewardship and management of northern water resources for future generations.

Following Ms. Merrithew-Mercredi's presentation, there was some discussion about how capacity limitations will affect the ability of Aboriginal organizations to discuss technical matters such as natural capital and valuation.

2.2.4 Dr. Dan Shrubsole, University of Western Ontario

INTEGRATED WATER MANAGEMENT: PRINCIPLES AND EXPERIENCES

Three general principles of integrated water management were identified in this presentation: informed decision making; planning for change; and collaboration, coordination and participation. Selected experiences in implementing these principles and associated challenges were provided using examples from Ontario, the United States and the European Union.

> "I encourage you to think boldly and to challenge the current system to achieve your water management needs."
>
> **Dan Shrubsole**

Dr. Shrubsole began by defining integrated water management as a process which promotes the coordinated development and management of water, land and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems." (*Global Water Partnership -Technical Advisory Committee, 2000*) and then focused on the key aspects to integration. Discussing options for designing a water stewardship strategy, he outlined three levels of Integrated Management Plans that can be written: normative, strategic and operational.

- A Normative plan sets out values and principles, targets, aspirations, and outcomes that you want. It includes quality of life values for an entire population. It is value laden. It addresses the question of what should be done with water resources.
- A Strategic plan addresses what *could* be done. For example it may examine local water supply and treatment. The proposed NWT strategy will address this level, at least in part. Examples of this level of planning includes what type of water treatment systems would be possible taking into account land use regulations, strategies, and requirements of water treatment plants.
- An Operational plan addresses what *will* be done. Integrated Water Resource Management is a process that includes vision/policy, situation analysis, strategy

the implementation stage there should informed decision-making, ensuring that nning for change and uncertainty has en taken into account and that laboration, coordination and public rticipation has been part of the process. Shrubsole closed by asking the audience think about Integrated Water nagement as a philosophy.

Figure 2: Dr. Dan Shrubsole

2.2.5 Ricki Hurst, Terriplan and David Livingstone, INAC

PLENARY OPEN FORUM DISCUSSION

What Was Heard

Q. *Many aboriginal groups are at a disadvantage when it comes to discussing technical matters due to capacity and resources.*

A. Agree this is a difficult problem. From a natural capital perspective, we can put a value on water, but it might not be only a monetary value. We must all contribute from the position we know best. It is not one thing or another, and we don't all have to be experts in every aspect. We must all get involved in whatever way we can.

What Was Heard

Q. *Most government documents come out as very technical, making them very difficult to understand. Is there a simpler way?*

A. Yes, I agree that a simple main document for the Strategy is necessary. The detailed technical documents are just for back-up. We probably need a 2-3 page executive /plain - language summary that hits the main points.

What Was Heard

Q. *I have a problem with the discussion about the economic value of water. We have to pay attention to the human value too. Once the draft Strategy is in place, I hope people will have a change to have a good hard look at it. I hope it will not just be pushed through. And I agree that everyone has to participate, but we need funding to do that.*

A. Couldn't agree more. We will only get a working Strategy if all northerners are involved and have the opportunity to participate and implement the plan. The closer we can work together in developing and implementing it, the better off we'll all be. We have an opportunity here...let's not squander it.

What Was Heard

Comment: *Up here in the north we are rich with water. We use water for travel, food, spiritual and cultural reasons. We understand how all the waterways are interrelated and depend on each other. What happens to one, affects the others. Elders tell us to protect the water as we did in the past or we have nothing. It is important that when we speak about water we are sitting in the same boat. If we are going to make a mistake, lets do it ourselves, rather than letting someone from somewhere else make decisions for us. Whatever we have to decide, we're going to have to live here together and to make the best decisions for all of us.*

What Was Heard

Q. *I am amazed to find that the NWT has11 official languages. The presentation on Natural Capital talked about communication. It is very difficult when translating one language to another. Natural Capital is the language of economists, not the language of the people. Perhaps this is an area where youth can become involved and to participate and understand the process.*

A. Getting young people involved is one of the challenges, and also one of the opportunities I see. They have not been involved much so far. Hopefully some monitoring projects can capitalize on youth involvement.

What Was Heard

Q. *How is climate change information fed into the decision making process, and can it be used to direct the Water Strategy?*

A. Not very well yet. There are still a few naysayers out there, and so it tends to not be well implemented. It might be better integrated by engaging the public. Get the word out. Talk to the politicians. Up here there is a lot more awareness of climate change issues, but the public has to influence the politicians if you want to see real change.

What Was Heard

We have been monitoring wastewater for years, but not doing much about it. The Fort Smith sewage lagoon sits alongside the Slave River....same with Fort Resolution and Hay River. The dump and lagoons are very close to the river and ultimately this is seeping into Great Slave Lake. We need to talk about these lagoons and move them away from the river. Nothing should be put into the river. Nothing. Studies have been done for so long, but nothing has been implemented.

What Was Heard

I know how much research is being done by the government on water. This is good, but we have to make sure that this information is brought back to the people. We have to make that information accessible. We must ensure that the information is disseminated outwards.

2.3 *Session 2: Current and Emerging Trends in Water Science and Stewardship*

2.3.1 Dr. Kathleen Racher, Regulatory Director, Wek'èezhìi Land and Water Board
The Role of Monitoring from a Regulatory Perspective

> "Overall, monitoring gives us the opportunity to do better."
> ***Kathleen Racher***

Dr. Racher's presentation discussed the needs of regulators with respect to monitoring (generally, and Wek'èezhìi Land and Water Board / **WLWB** in particular), and how monitoring contributes to integrated management. The discussion covered various types of water-related monitoring programs, their role in water management, and the experience of the WLWB and its plans with respect to monitoring. Perspectives on how monitoring and needs of regulators could be addressed in the Water Stewardship Strategy were also presented.

Dr. Racher explained that the WLWB has jurisdiction over land and water in the **Wek'èezhìi region.** The Sahtu and Gwich'in regions are under the jurisdiction of their respective land and water boards, and the NWT Water Board is responsible for permitting in the ISR. The Mackenzie Valley Land and Water Board (MVLWB) covers the remaining areas which do not have settled land claims.

The various land and water boards regulate the use of land and water and deposits of waste into water through the issuance of land use permits and water licenses. Water licenses contain rules for controlling waste and its release into the environment. They set discharge limits at the 'end of the pipe'. They also limit the amount of chemicals that can be released. Monitoring is used to track whether licenses are being adhered to and if they are effectively protecting the environment. A permit is required If there might be an effect to the downstream water users, the conditions of which control the use of that water.

Dr. Racher went on to explain the link between land & water boards and the NWT Water Stewardship Strategy. She stated that there is considerable amount of data and knowledge to share through toxicity test results and other monitoring data that has been collected. Their research is specific to northern environments, and they have experience in integrated resource management. She believes that we first need to define a common vision and guiding principles on how we value water, followed by the development of water quality objectives. Developing and maintaining a forum for shared decision making with respect to water will benefit all northerners.

2.3.2 Carole Mills, Water Resources Division, INAC
TRADITIONAL KNOWLEDGE AND AQUATIC MONITORING PROGRAMS

Traditional Knowledge (TK) and its contributions to aquatic monitoring programs was presented by Carole Mills. The roles of science and TK and what they can bring to monitoring programs were discussed., and some examples of successful use of traditional knowledge in aquatic monitoring programs and 'lessons learned' were provided. Ms. Mills also made some suggestions for how traditional knowledge can be used in shaping the NWT Water Stewardship Strategy.

> "Up here in the north, we are rich with water"
> ***Joe Rabesca***

Ms. Mills began by presenting the 2005 GNWT definition of TK as "knowledge and values which have been acquired through experience, observation, from the land or from spiritual teachings, and handed down from one generation to another"; and from the Northern Contaminant Program as "An existing Aboriginal knowledge system of lands, waters, climates, seasons and related animal behaviours in an Aboriginal territory, based on ancestral experiences, oral history and subsistence harvesting and traditional use of plants and animals, as well as the use of historical waterways, trails and other nomadic paths." She explained the similarities to western science in that it is holistic, verifiable, repeatable, peer reviewed. There are experts in particular aspects of traditional knowledge...everyone does not know everything, and there may sometimes be contradictions and opinion differences, but the knowledge evolves over time.

Accessing this information requires resources, money, time and people to collect it. She reinforced the idea that TK is proprietary intellectual property, and the rights to it are owned by the people who have it.

Ms. Mills quoted Florence Catholique (Lutsel K'e) as noting that the NWT Water Stewardship Strategy should recognize that TK is different in each area and sometimes in each community, and the source of the TK (including the individual elder or harvester) must be appropriate. In this context, TK is not just another source of knowledge or information. It also considers how to involve people and make decisions and it must be based on respect and understanding of the values of Aboriginal peoples.

Ms. Mills provided some detailed guidelines to consider before beginning any aquatic effects monitoring program. There is not a "one off" approach to obtaining TK; there must be a process which allows for continued interaction, a continued relationship, and an ongoing dialogue.

Finally she suggested that we have to allow time to absorb information, consult with others, and make decisions. The mode of information sharing is important and begins with one-to-one conversations, small groups and workshops, video, layman's summaries, and finally moving to technical reports, and Internet web-sites.

Including TK in AEMPs can potentially result in many benefits such as the following:

- Locals act as watchdogs and messengers;
- Extensive historical knowledge is used;
- Effective monitoring results;
- Long term understanding of the project;
- Brings credibility to the project;
- Overall better program, by using all available knowledge;
- More protective of the environment;
- Smoother review and approvals; and
- Can be less expensive

Ms. Mills reiterated that including Aboriginal Peoples and communities in all aspects of a program will increase trust, respect and understanding.

3.0 DAY 2

3.1 *DAY 1 RECAP: WHAT WE HEARD*

Terriplan Consultants presented some of the key messages heard the previous day. These included the following:

- Remember that everything is connected
- It is critical to work together and to link all the various pieces of information together
- There is a comprehensive role for TK in the development and implementation of the NWT Water Stewardship Strategy
- Importance of consultation and communication
- Capacity issues in communities
- There is sometimes more than one way to do things. Be inclusive.

- The approach for the NWT Water Stewardship Strategy is consistent with models in other jurisdictions. Participants from other jurisdictions not involved in its development view it as innovative and leading-edge.
- Information sharing and networking is crucial
- Everyone has a contribution to, and everyone should benefit from the Strategy
- Implementation is a collective organizational and individual responsibility
- The Strategy must engage everyone – elders, youth, community members, government, regulators, industry, NGOs and others
- "Gold and diamonds are valuable, but not as valuable as water" (Joe Rabesca, quoted by K. Racher)
- "There is no dollar value to being able to dip your cup in the lake and drink it." (Dan Shrubsole)

3.2 *SESSION 2 (CONT'D)*

3.2.1 Dr. Steve Kokelj, INAC
NWT DELTA ENVIRONMENTS – MACKENZIE DELTA

Presentations on the Mackenzie and Slave deltas addressed the evolution and the natural forces that shape them. Steve Kokelj discussed the nature and importance of aquatic ecosystems in the Mackenzie Delta, and how activities upstream have the potential to affect these critical aquatic ecosystems. He touched on current research and community monitoring activities and made some recommendations for further research and monitoring in the Mackenzie Delta.

> "To watch and understand the land and to use it respectfully forever."
>
> **NWT CIMP**

Dr. Kokelj began by presenting an overview of the Mackenzie Delta region, noting that it is one of the most rapidly warming regions of the circumpolar north. Climate change is affecting the permafrost and has major implications for the development of long-term infrastructure. There are already many 'thaw slumps' that are the result of melting permafrost. Research has shown that permafrost has much higher nutrient levels that the more active upper soil level, and if these slumps occur near northern lakes, they have found that the chemical load in the lakes is much higher. This causes the water chemistry in the lakes to rapidly change, ultimately resulting in negative impacts to water quality and aquatic ecosystems in the region, and these impacts are expected to intensify with climate warming in the future.

Figure 3: Mackenzie River Delta, courtesy of Dr. Steve Kokelj

Dr. Kokelj then presented some material to help participants understand large-scale ecological change in the Mackenzie Delta region, discussing a case study of a storm surge that had long-term impacts on the ecosystems of over 10,000 hectares near the mouth of the Mackenzie River. The resulting devastation was not recognized by scientists at the time the storm surge occurred in 2002, but was more widely known by local residents. Dr. Kokelj reiterated the importance of community monitoring, recognizing the importance of TK and the critical need for an integrated monitoring and research system. Steve recommended that an entity with a mandate to pull together all various pieces of information together would allow for more effective environmental decisions. The NWT Cumulative Impact Monitoring Program (CIMP) could provide this function. The Mackenzie Delta region is dynamic and complex environment. An information base is required for decision making, to understand natural variability, and this must include traditional, local and scientific knowledge. Coordination and guidance in required to accomplish this, and so that the information can be properly analyzed and shared. To this end, capacity is required.

3.2.2 Dr. Mike English, Wilfrid Laurier University

NWT Delta Environments: Changing Slave River Flow Regime and Hydro-geological Controls on Biological Productivity of the Slave River Delta

Understanding the natural hydrological and biological health and ecological integrity of the Slave Delta depends upon a Slave River flow regime that transports a significant quantity of sediment, and floods the outer delta reasonably frequently. The rate and direction of delta progradation into Great Slave Lake is dictated by the distributary evolution and erosional influences of the lake.

Dr. English began by explaining how deltas are formed and then posed the question *"If some company with more money than they know what to do with proposes to dam the Slave River, on what basis do you make a decision?"* Is it possible to moderate the influence of a dam or multiple dams AND a changing hydrological cycle as well? How can you attempt to answer these questions? He began by noting that you first have to identify what is important in terms of maintaining high biological productivity. You must first understand how the system works before you can make informed decisions.

Dr. English discussed three deltas in the region, the Mackenzie, the Slave and the Peel River deltas, stressing the importance of the biological diversity and cultural importance of each. As these waterways are interconnected, what happens to one, affects the others. Everything is interconnected. Altering the flow of water in one river potentially affects the delta formations in another. This in turn affects the type, quantity, extent and health of delta vegetation. It is important to do modelling to reconstruct the pre-development environment.

3.2.3 Anne Wilson, Northern Research Working Group/Environment Canada, and Catherine Mallet, Northern Research Working Group INAC

NWT Wastewater Management – Future Directions

This presentation outlined changes in wastewater management in the NWT related to the Canadian Council of Ministers of the Environment's (CCME) *Canada-wide Strategy for the Management of Municipal Wastewater Effluent* (February 2009), and what this means for the North. The purpose of the Strategy is to improve wastewater effluent quality in Canada – to a level approximately equivalent to secondary treatment. Anne provided an overview of where things are at now. The Strategy defines the North as four areas: NWT, Nunavut, Nunatsiavut, and Nunavik. Currently in the North, the predominant treatment method involves use of lagoons. The Strategy will apply to those systems which discharge to surface waters. Currently

we see a wide variation in treatment results between systems and over each season. At this point we only have snapshots of most of the communities, and we see that more study is needed to identify what high latitude systems are capable of if managed optimally. Various initiatives are underway to help identify appropriate effluent quality performance standards for the North, and a number of groups are involved in this work.

It is expected that Northern wastewater systems will have to meet nationally regulated performance standards, which will almost certainly be lower than currently regulated limits. The Strategy acknowledges challenges in the North and provides a window of up to five to undertake research into factors that affects performance of wastewater facilities in northern conditions. Identifying appropriate performance standards will require research collaboration, risk assessment and community involvement.

In the meantime, effluent quality requirements in existing authorizations will continue to apply, and existing compliance, monitoring and reporting requirements will be retained. The CCME is in the process of forming the Far North Working Group and a work plan. The Northern Research Working Group (NRWG) will continue to be active, and Environment Canada continues to be active in research, developing regulations and in the Sampling Contaminants Management Program. The mandate of the NRWG is to gain an understanding of municipal wastewater effluent and site conditions in the North in order to evaluate the environmental risks associated with Municipal Waste Water Effluent (MWWE) discharges. To date, they have prepared a number of report compilations and undertaken a number of MWWE Sampling programs. They are committed to a comprehensive education and communication program as well and have hosted a number of workshops and conferences on various aspects of wastewater management. Community operators are an important component of the system, and it is essential to have them understand the requirements and participate in meeting them. The NRWG is a good communication forum, and brings together regulators, municipalities, and experts from across the region.

Figure 4: Waste Water Sampling, Courtesy Environment Canada, INAC

3.2.4 Dr. Barrie Bonsal, Environment Canada

CLIMATE CHANGE AND IMPLICATIONS FOR NORTHERN WATER RESOURCE MANAGEMENT

Following an introduction to climate change and how it relates to different aspects of water, Dr. Bonsal provided some insights into current observed and projected changes in climate as they relate to water; and linkages between climate change and water resources on a national and regional basis. He also discussed implications for policy and sustainable development and notes some gaps in knowledge and made recommendations for further research and monitoring.

Some of the predicted climate changes noted by Dr. Bonsal included:

- Global surface temperatures are rising
- Changes in temperature are unevenly distributed
- Annual mean temperatures are rising
- Seasonal temperature trends indicate: the west is warming, the east is cooling
- A variety of indicators show a changing arctic climate
- There is an increase in precipitation over Northern Canada, impacting snow cover.
- Research indicates spring is coming two weeks earlier and fall is coming 2 weeks later in the north already
- River and lake ice is melting earlier in the Mackenzie River basin

- By the end of the century there could be a 5-6 degree average temperature increase, or even higher in the Arctic region
- Snow depth is an integrated response to temperature & precipitation
- General decrease in snow depth because of increase in air temperature
- Increase in extreme North due to an increase in precipitation
- Continued warming; uncertainty regarding magnitude
- Continued impacts of warming on snow and ice resulting in a marked North to South contrast
- With climate warming, there will be an intensification of the hydrologic cycle
- Overall, it is projected to increase total water "availability", however, this will vary significantly in both time and space
- Decreased winter snow (from higher temp) and earlier spring runoff = greater need for seasonal water transfers (i.e., *storage and release*)

Some of the water issues related to climate change noted by Dr. Bonsal include:

- Water Availability/Aquatic Ecosystem Health
  - e.g., droughts & floods;
  - municipal water supply;
  - productivity of lotic & lentic systems
- Integrated watershed management in response to climate variability & climate change
  - rivers, lakes, reservoirs, wetlands, groundwater, & cryosphere
- Separating the impacts of human influence from natural climate variability & climate change
  - e.g., water abstraction & flow regulation
- Growth in disparity between *water-rich* and *water-poor* regions
- Likely be a call for enhanced inter-basin flow transfers among various jurisdictional levels to reduce disparity
- Increasing need to store water with infrastructure as natural snow-regime storage diminishes; major economic costs
- Economic implications for multiple water resource users

Some of the critical research issues identified are the lack of available and/or consistent climatic and hydro-metric data (especially in the North) required to characterize and understand past hydro-climate. This is necessary to make reliable future climate projections.

3.3 *Session 3: Applying Information in Support of Water Management and Stewardship*

3.3.1 Mike Palmer, The Nature Conservancy Program
A Freshwater Classification of the Mackenzie River Basin

The relevance and purpose of the freshwater classification system for the Mackenzie River Basin, particularly with respect to the NWT Protected Areas Strategy (PAS) was the focus of this presentation. Comments on the partnerships that have been used to develop the system, experience elsewhere with this type of system, and how science and Traditional Knowledge has been used in developing the classification system were provided. Gaps in science that should be addressed from the perspective of the classification system and the relevance of the system to various water resource management activities including the NWT Water Stewardship Strategy were also identified.

The PAS is a policy document to help provide support to communities what want to protect particular areas of the environment. There is a need to complete a network of protected areas as part of our environmental and water stewardship, and scientific information should be used to make sound decisions.

Mr. Palmer explained that there are 5889 catchments in the Mackenzie River Basin, from large to small, and every catchment gets a value for data sets. A catchment area is the area around a stream that flows into that stream. The data sets include information on catchment size, glacial activity, permafrost, soil type and groundwater. Computer assisted analysis of the catchments allows for the creation of detailed maps with this information available in layers.

It is hoped that this information will be used for protected areas planning, in making land use planning decisions, for monitoring, as a basis for water management, and for all kinds of water and land habitat information. The report and data will be freely available to the public soon.

3.3.2 Bob Overvold, Sahtu Land Use Planning Board
The Sahtu Land Use Plan: A Tool for Water Management and Stewardship

The Sahtu Land Use Planning Board has just released Draft 2 of the Sahtu Land Use Plan (SLUP). This presentation provided a brief overview of the current draft plan and future directions, highlighting values and considerations related to water management and stewardship. Of special consideration is the work done on the Great Bear Lake Watershed Management Plan and it will be integrated into the Sahtu Land Use Plan.

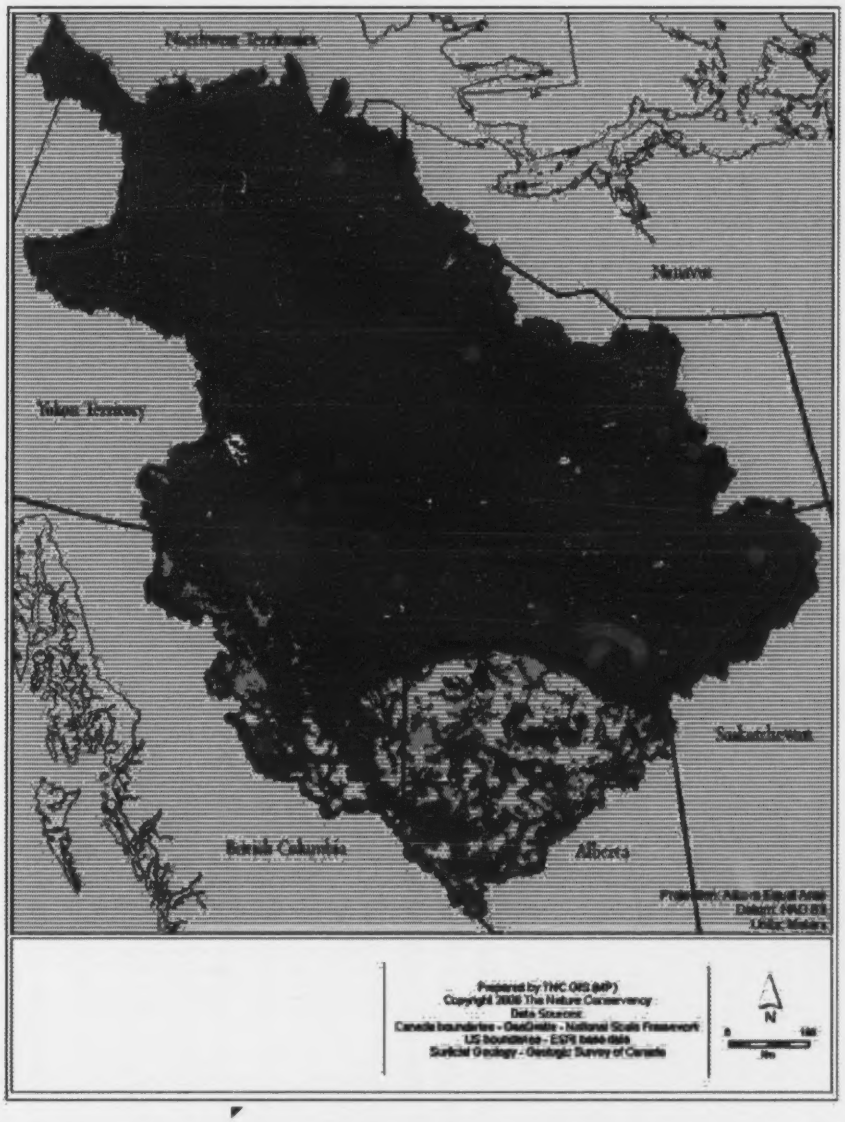

Figure 5: Example of a Freshwater Classification Map, courtesy Mike Palmer
NB: Each color represents a unique combination of dataset classes

The Sahtu Land Use Planning Board is a co-management board mandated to prepare the Sahtu Land Use Plan and monitor its implementation. The Plan must be approved by the Sahtu Secretariat Inc, the GNWT and Government of Canada. The preliminary draft plan was released in 2003, the 1st draft in 2007, and the second draft in April of 2009. It is currently out for consultations. The Plan maps traditional uses, historic sites, watersheds, and zoning. The

current draft also includes special management zones, proposed conservation and heritage zones. Mr. Overvold noted that the Great Bear Lake Watershed is managed according to the Great Bear Lake Watershed Management Plan, and the Sahtu Land Use Plan does not currently apply in this area. There are some special areas of focus including karst landscapes, which are very sensitive, and developers must either avoid karst areas in order to minimize development impacts. He noted that INAC must develop enforceable water quality guidelines for the whole Mackenzie Valley, and developers must treat waste water before returning it to the rivers and lakes and they cannot be allowed to contaminate existing water sources.

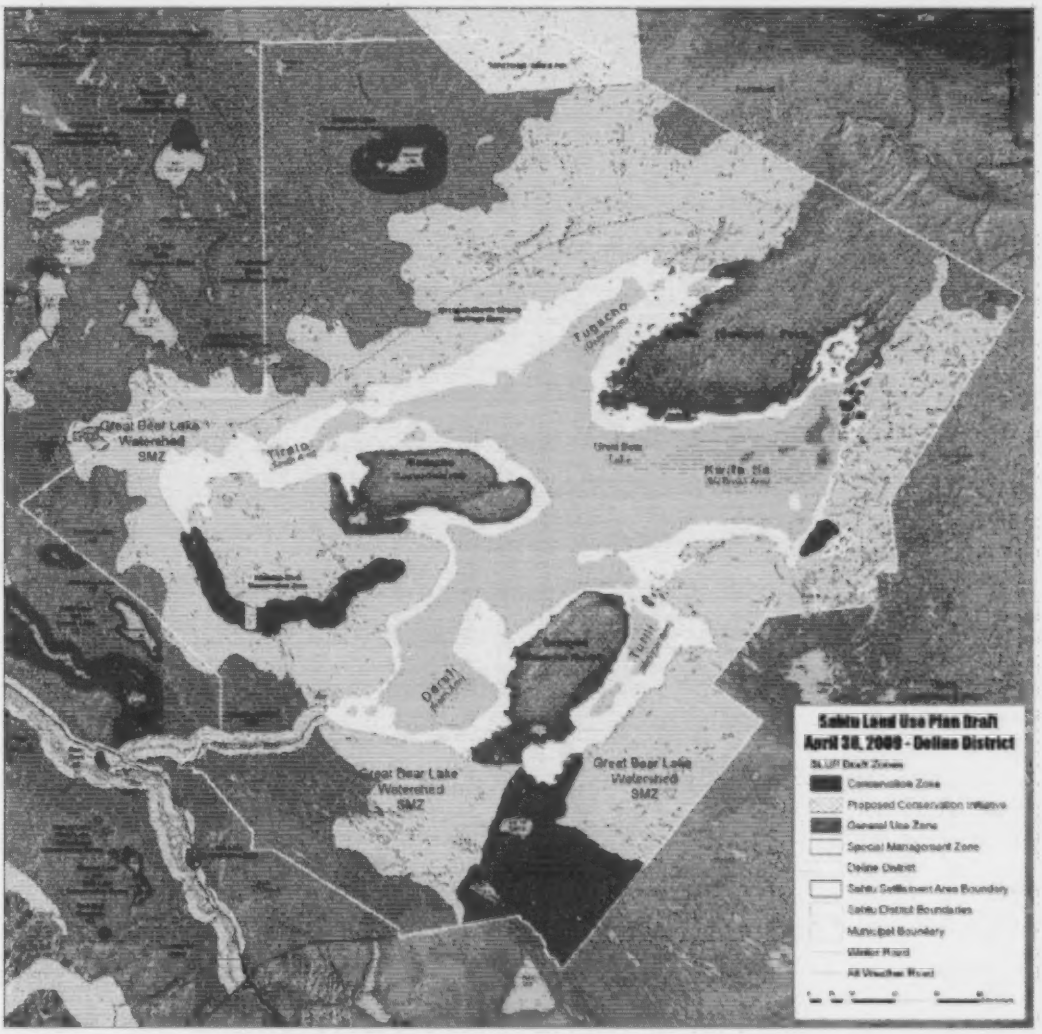

Figure 6: Sahtu Land Use Plan, April 30 2009, Courtesy SLUPB

The Great Bear Lake Water Management Plan (GBLWMP) was completed in May 2005. It has no legal status of its own, and is intended to be implemented through the SLUP. It needs to be integrated with the SLUP and in order for that to happen, it must be implementable and approvable. The GBLWMP must be updated, and it has not yet gone out for consultation. Mr. Overvold suggested that it will not be approved without changes. It is intended to be attached to the SLUP when it goes out for consultation in June and July of this year, with comments due back by July 31st 2009.

Figure 6: Participants networking

3.3.3 Ricki Hurst, Terriplan Consultants

WATERSHED GEODATABASE: A GEOGRAPHICALLY INTEGRATED DATABASE

Terriplan Consultants was asked to look into the development of a support system for the NWT Water Stewardship Strategy. It is still a work in progress, but one of the tasks was to create a comprehensive geodatabase. Currently the architecture of the Geodatabase has been built, and it is now being populated. Ricki also described the structure, gaps and limitations of this model.

The objective is to compile all the data for all NWT watersheds that is relevant to forecasting and monitoring changes in water quality and quantity. The data will be compiled for upstream and downstream portions of NWT watersheds. Watersheds feature datasets including weather, hydrology, cultural values, water quality, ecosystems, water supply and demand, and recreational uses. Some are well populated, while others are virtual placeholders until more data is available. Mr. Hurst described some of the primary and secondary sources of data, noting that there exists a large body of data out there though it may be in different forms and locations. WaterWise is a decision-support tool that Mr. Hurst described as a relational database to store, query and manipulate spatial data. It is a tool for organizing and managing information in order to facilitate informed and consistent decision-making. As the client (INAC/GNWT-ENR) intends the database to be transparent and accessible to everyone, WaterWise will need a central repository to enable periodic updating.

In the future, it is hoped that this system will be able to track detailed information on fisheries, wildlife, ecosystem biodiversity, spiritual and cultural values, as well as data for upstream jurisdictions. As a northern resource, it has the potential to be rich in local information and to assist in water-related decision-making.

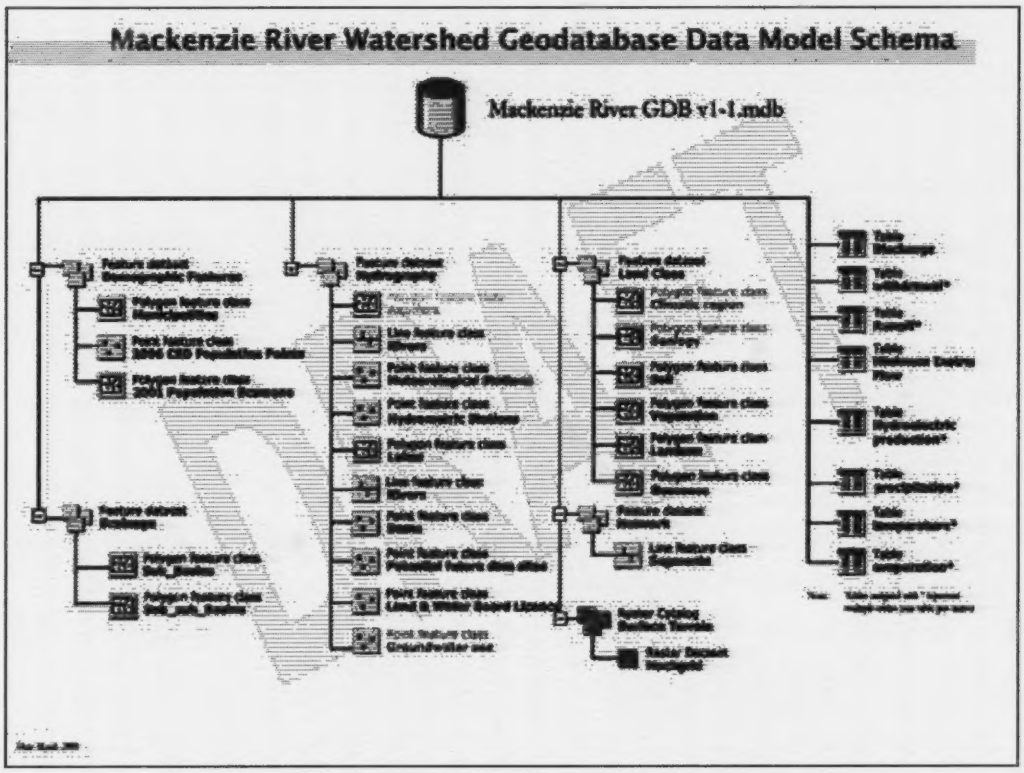

Figure 7: Mackenzie River Geodatabase Data Model Schema (Terriplan Consultants)

3.4 *SESSION 4: MOVING FORWARD TOGETHER AS WATER MANAGERS AND STEWARDS*

3.4.1 Ashley Mercer

NORTHERN SCIENCE AWARD

Ashley Mercer presented information on this years' Northern Science Award, created to help empower NWT residents to do environmental science. Supporters of the award include Dillon Consulting, Gaea Consultants, Terriplan Consultants, DPRA Canada and MacDonald Environmental Sciences Ltd.

There were three 2009 recipients for this award. Aryn Franklin received $2500 for university, Brad McInnes received $2500 for college and Jolene Lennie received a merit award of $500. Congratulations were extended to the recipients, and thanks to the contributors for making these awards possible.

3.4.2 Joseph Boyden, Author and Water Advocate

STILL WATER? REFLECTIONS ON A FIRST PEOPLE'S AND A GREAT NATION'S MOST VALUABLE RESOURCE

Mr. Boyden introduced himself as a writer, a teacher, a Métis, and person who has lived among the James Bay Cree for a number of years. He currently divides his time between Canada and New Orleans, noting the strong connection he feels to water. Joseph described the water in New Orleans as a belligerent child. Many see water as the enemy, to be harnessed or diverted. Most First Nations don't see it that way. The Anishinabe have humans at the bottom of the food chain, precisely the opposite of the Christian viewpoint. Other species do not need us, but we need everything in the natural world. We give thanks for what gives us life. We are not its masters.

Joseph went on to explain how in 2008, he began receiving emails from friends living around James Bay. They were relating a shaman's vision that the area was in some kind of fault zone, and there were going to be huge flooding a great disaster with the water in the area. People took the vision seriously and some started to leave because of these rumours.

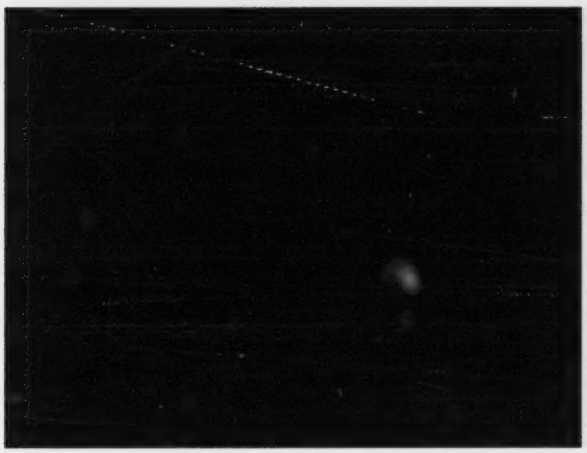

Figure 9: Joseph Boyden

He told the audience how the Ontario Power Authority (OPA) is planning a number of dams within the James Bay Treaty 9 area, and virtually none of the Cree know anything about it. They had not been consulted in any way. He also discussed the impact that the group, Waterkeeper Alliance, has had on him personally and on a huge number of waterways in general. Waterkeeper is the fastest growing environmental organization in the world, and is headed by Robert Kennedy Jr. It is primarily a watchdog group that believes that water belongs to the people. Their emphasis is on grass-roots environmentalism, and they believe strongly in the 'polluter pays' principle. They are able to fund testing of water, and provide expert legal council on environmental issues. He wondered

if such a group would fly in Aboriginal communities in northern Ontario, and eventually mobilized some interest among chiefs and others in the region.

Figure 10: SCN Participants

In a sometimes humorous, but eloquent way, he eventually brought the story around to point that James Bay is really a political fault line, and the issues around water that are resulting from OPA's bid to dam a number of rivers, may be the shaman's vision. Since that time Joseph has joined the Moose River Waterkeeper movement as President and is working hard to bring these issues to the people of the area. It is up to the people to defend their right to clean water. After writing a scathing article for Macleans Magazine last year, the OPA hearings were cancelled and OPA has since backed off. He summed up by noting the critical importance of Aboriginal consultation throughout all development processes.

Mr. Boyden closed by reading a passage from his newest book "Through Black Spruce".

3.4.3 Panel and Open Forum Discussion

An open forum discussion followed a panel consisting of representatives from NWT Aboriginal organizations/communities – Sonny MacDonald (MRBB member), Richard Binder (Inuvialuit Game Council), Arthur Beck (Northwest Territory Métis Nation) and Tim Heron (Northwest Territory Métis Nation).

After introducing the panel, Ricki Hurst posed a number of questions and each panel member responded briefly.

What Was Heard

Question 1: What was most interesting to you about this year's conference? What did you learn?

A: *It is mind boggling how much information is out there. Everyone needs to have access to the best information available.*

A: *I learned that we do have to work together...for the common goal. We need to stop talking soon and start implementing.*

A: *We need to stop studying and start implementing. We need to be partners. Start listening. Stop doing the scientific studies and start implementing before it's too late.*

A: *It's all common sense. Scientists have their knowledge. TK is different. The whole aspect is different. We look at the big picture and see how everything is connected. It is a more holistic view. Everything connects. Things are already changing.*

What Was Heard

Question 2 : What more needs to be done if we are to move together as water stewards?

A: *We have to trust each other. We have to use the western knowledge and the TK together. We've got diamond mines and oil wells, but we can't live on oil and diamonds. Everyone is coming after our water. If we show them that we are taking care of our own backyard, then they will have to follow. Also communication and education is the key. Everybody has to understand what's going on.*

A: *There are increasing demands on our resources. We here in the north are planning ahead, and should be looking at alternative uses of water. We could be looking at cost-effective ways of making sea water useable. This might be one solution to the rise in sea water that is expected.*

A: *We have to work together...bring all our strengths to bear on these water issues. I was invited to speak at the UN conference on water sustainability in New York. I told them, when I get back to Canada, I can dip my cup in the lake and drink it, but how long is that going to last? Everywhere the water is getting more and more polluted. In Bolivia things are even worse. Private companies own the water and sell it back to the people. I think people that own the land should own the water rights.*

A: *Humans are the problem. A few years ago a Russian satellite crashed into Great Slave Lake. There are barges full of uranium at the bottom of the lake. All kinds of junk has just been stuffed into a pit and covered up. Dangerous stuff! We have to let the world know what is being done to us. We can fix it.*

The conference closed with a reading from Dr. Seuss's 'The Lorax', by David Livingstone, INAC.

Way back in the days when the grass was still green
and the pond was still wet
and the clouds were still clean,
and the song of the Swomee-Swans rang out in space...
one morning, I came to this glorious place.
And I first saw the trees!
The Truffula Trees!
The bright-colored tufts of the Truffula Trees!
Mile after mile in the fresh morning breeze.....

I am the Lorax. I speak for the trees.
I speak for the trees, for the trees have no tongues.
And I'm asking you, sir, at the top of my lungs–
he was very upset as he shouted and puffed–
What's that THING you've made out of my Truffula tuft?.....

Look, Lorax, I said. There's no cause for alarm.
I chopped just one tree. I am doing no harm.
I'm being quite useful. This thing is a Thneed.
A Thneed's a Fine-Something-That-All-People-Need!
It«s a shirt. It's a sock. It's a glove. It's a hat.
But it has other uses. Yes, far beyond that.
You can use it for carpets. For pillows! For sheets!
Or curtains! Or covers for bicycle seats!
The Lorax said,
Sir! You are crazy with greed.
There is no one on earth
who would buy that fool Thneed!.....

You're glumping the pond where the Humming-Fish hummed!
No more can they hum, for their gills are all gummed.
So I'm sending them off. Oh, their future is dreary.
They'll walk on their fins and get woefully weary
in search of some water that isn't so smeary.....

The Lorax said nothing. Just gave me a glance
just gave me a very sad, sad backward glance
as he lifted himself by the seat of his pants.
And I'll never forget the grim look on his face
when he hoisted himself and took leave of this place,
through a hole in the smog, without leaving a trace.

And all that the Lorax left here in this mess
was a small pile of rocks, with one word...
UNLESS.

UNLESS someone like you...cares a whole awful lot....nothing is going to get better...It's not."

Excerpt from "The Lorax", by Dr. Seuss.

The conference ended with a closing prayer from Michel Louis Rabesca.

APPENDIX A: PARTICIPANT LIST

SCIENCE IN THE CHANGING NORTH 2009

June 15-16 2009 - Tree of Peace, Yellowknife, NT

NWT Water Resources Stewardship

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APPENDIX B: AGENDA

SCIENCE IN THE CHANGING NORTH 2009

June 15-16 2009 - Tree of Peace, Yellowknife, NT

NWT WATER RESOURCES STEWARDSHIP

Agenda- June 11. 2009

Day 1 – Monday June 15, 2009		
Time	**Topic**	**Lead**
8:30 - 9:00	**Registration**	***Terriplan Consultants***
9:00 – 9:10	**1. Call to Order**	***Facilitator, Terriplan Consultants***
9:10 – 9:30	**2. Welcome and Introductory Remarks**	***Hon. Michael Miltenberger, Minister of Environment & Natural Resources, Government of the Northwest Territories (GNWT)***
9:30 – 10:15	**3. Keynote Address: Canoeing with the Caribou** A dramatic photographic journey will focus on the McGuffin's travels, including the Arctic/ subarctic portion of their Wilderness River Expedition Art Foundation (WREAF) journeys on the George River from Indian House Lake to Ungava Bay, and photos of a project with the Innu in northern Labrador. Joanie will share insights from journeys to the Boreal's northern range, experiences with the caribou and the link between the Arctic and Lake Superior.	***Joanie McGuffin, Photojournalist, Adventurer***
10:15 – 10:30	**Health Break**	
Session 1: Overview & Status of the Development of the NWT Water Stewardship Strategy		

Day 1 – Monday June 15, 2009		
Time	**Topic**	**Lead**
10:30 – 11:00	**4. Northern Voices, Northern Waters – NWT Water Stewardship Strategy** The geo-political context for the development of the NWT Water Stewardship Strategy will be described, as will the environmental aspects of water stewardship in the NWT, northerners' concerns, and what is being done now and should be done in the future. How can the NWT set the standard for the rest of the country? An overview of the NWT Water Stewardship Strategy will also be presented, including how it is being developed, key principles and goals of the Strategy, and the path forward.	***Mark Warren, GNWT-ENR*** ***David Livingstone, Indian and Northern Affairs Canada (INAC)*** ***Aiyana Lajeunesse, GNWT-ENR***
11:00 – 11:45	**5. Natural Capital: A Bridge over Troubled Waters** The concept of natural capital will be explained, and the reasons why some people are very attracted to it for organizing information for water management and stewardship discussed. Why are others are more skeptical and yet others are totally opposed? The valuation of ecological goods and services and its [illegible]ion to natural capital will also be reviewed. Participants [illegible]hen formulate their own positions and better [illegible]nd the positions of others, especially with respect to [illegible]er and how natural capital can contribute to better decisions.	***Dr. Peter Victor, Faculty of Environmental Studies, York University***
11:45 – 1:00	**Lunch (on your own)**	
1:00 – 1:30	**6. Mackenzie River Basin Board - Update: Recent and upcoming activities and Relevance to NWT Water Strategy** A brief overview of the Mackenzie River Basin Board and its current and upcoming activities and initiatives will be provided, including the updated State of the Aquatic Environment Report and the Mackenzie Basin Hydrology Model. The importance of bilateral agreements between jurisdictions and the inclusion of traditional knowledge, the participation of Aboriginal Peoples in the work of the Board and transboundary water management will be discussed. Future directions of the Board and relevance to the NWT Water Management and Stewardship Strategy will be reviewed.	***Trish Merrithew-Mercredi, Regional Director General – NWT Region, Indian and Northern Affairs Canada (INAC)/ Mackenzie River Basin Board***

Day 1 – Monday June 15, 2009		
Time	**Topic**	**Lead**
1:30 – 2:00	**7. Integrated Water Management: Principles and Experiences** Three general principles of integrated water management have been identified - informed decision making; planning for change; and collaboration, coordination and participation. Selected experiences in implementing these principles and associated challenges will be provided using examples from Ontario, the United States and the European Union.	***Dr. Dan Shrubsole, University of Western Ontario***
2:00 – 2:30	**8. Plenary Open Forum Discussion**	***Facilitator/Participants***
2:30 – 2:45	**Health Break**	
Session 2: Current and Emerging Trends in Water Science and Stewardship		
2:45 – 3:15	**9. Mikisew Cree First Nation's Community-Based Water Monitoring Program** The Mikisew Cree First Nation's Environmental Monitoring Project will be discussed, with a focus on the water component. Highlights will include their work with the Center for Indigenous Environmental Resources (CIER), the TEK and scientific indicators developed to reflect the issues and concerns identified by the community; the pilot project; capacity-building approaches and challenges in bringing together TK and science; and best practices and 'lessons learned'.	***Matthew Whitehead, Mikisew Cree First Nation (note – Mr. Whitehead was unable to attend due to travel issues at the Edmonton airport, and sent his regrets)***
3:15 – 3:45	**10. The Role of Monitoring from a Regulatory Perspective** The needs of regulators (generally, and WLWB in particular) with respect to monitoring, and how monitoring contributes to integrated management, will be discussed. Various types of monitoring programs for water, and their role in water management, the WLWB experience and plans with respect to monitoring will be covered, along with some lessons learned. Perspectives on how monitoring and needs of regulators could be addressed in the Water Stewardship Strategy will be presented.	***Dr. Kathleen Racher, Wek'èezhìi Land and Water Board***

Day 1 – Monday June 15, 2009		
Time	**Topic**	**Lead**
3:45 – 4:15	**11. Traditional Knowledge and Aquatic Monitoring Programs** Traditional Knowledge and its contributions to aquatic monitoring programs will be presented. The roles of science and TK and what they can bring to monitoring programs will be discussed. Examples of successful use of traditional knowledge in aquatic monitoring programs and 'lessons learned' will be provided including suggestions for how traditional knowledge and its role in monitoring can be addressed in the Strategy.	***Carole Mills, Indian and Northern Affairs Canada (INAC)***
4:15 – 4:30	**12. Daily wrap- up /Adjournment**	***Facilitators***

Day 2 – Tuesday June 16, 2009		
Time	**Topic**	**Lead**
Session 2: Current and Emerging Trends in Water Science and Stewardship (cont'd)		
9:00 – 9:15	**13. Introduction - Day 1 Recap, Overview of Day 2**	***Facilitators***
9:15 – 10:15	**14. NWT Delta Environments: Mackenzie Delta** Presentations on the Mackenzie and Slave deltas will address the evolution and the natural forces that shape them. Speakers will discuss the nature and importance of aquatic ecosystems in the Mackenzie delta; and how activities upstream have the potential to affect these critical aquatic ecosystems. They will touch on current research and community monitoring activities and make some recommendations for further research and monitoring in the Mackenzie Delta. **Changing Slave River Flow Regime and Hydro-geo-ecological Controls on Biological Productivity of the Slave River Delta** Understanding the natural hydrological and biological health and ecological integrity of the Slave Delta depends upon a Slave River flow regime that transports a significant quantity of sediment, and floods the outer delta reasonably frequently. The rate and direction of delta progradation into Great Slave Lake is dictated by the distributary evolution and erosional influences of the lake.	***Dr. Steve Kokelj, Indian and Northern Affairs Canada (INAC)*** ***Dr. Michael English, Wilfrid Laurier University***
10:15 – 10:45	**15. NWT Wastewater Management – Future Directions** This presentation outlines changes in wastewater management in the NWT related to CCME's *Canada-wide Strategy for the Management of Municipal Wastewater Effluent* (February 2009), and what this means for the North. Various initiatives are underway to help identify appropriate effluent quality performance standards for the North, and a number of groups are involved in this work.	***Northern Research Working Group: Anne Wilson, Environment Canada and Catherine Mallet, Indian and Northern Affairs Canada (INAC)***
10:45 – 11:00	**Health Break**	

Day 2 – Tuesday June 16, 2009		
Time	**Topic**	**Lead**
11:00– 11:30	**16. Climate Change and Implications for Northern Water Resource Management** Following an introduction to climate change and how it relates to different aspects of water, Dr. Bonsal will provide some insights into current observed and projected changes in climate as they relate to water; and linkages between climate change and water resources on a national and regional basis, along with implications for policy and sustainable development. He will discuss gaps in knowledge and recommendations for further research and monitoring.	***Dr. Barrie Bonsal, Environment Canada***
Session 3: Applying Information in Support of Water Management and Stewardship		
11:30 -12:00	**17. A Freshwater Classification of the Mackenzie River Basin** The relevance and purpose of the freshwater classification system for the Mackenzie River Basin, particularly with respect to the NWT Protected Areas Strategy, will be the focus of this presentation. Comments on the partnerships that have been used to develop the system, experience elsewhere with this type of system, and how science and Traditional Knowledge has been used in developing the classification system will be provided. Gaps in science that should be addressed from the perspective of the classification system and the relevance of the system to various water resource management activities including the NWT Water Strategy will be identified.	***Mike Palmer, The Nature Conservancy Canada Program***
12:00 – 1:00	**Lunch (on your own)**	
1:00 – 1:30	**18. The Sahtu Land Use Plan: A Tool for Water Management & Stewardship** The Sahtu Land Use Planning Board has just released Draft 2 of the Sahtu Land Use Plan. This presentation will provide a brief overview of the current draft plan and future directions, highlighting values and considerations related to water management and stewardship. Of special consideration is the work done on the Great Bear Lake Watershed Management Plan and how that Plan will be integrated into the Sahtu Land Use Plan.	***Bob Overvold, Sahtu Land Use Planning Board***

Day 2 – Tuesday June 16, 2009		
Time	**Topic**	**Lead**
1:30 – 2:00	**19. . Watershed Geodatabase: A Geographically Integrated Database** The relevance and purpose of the Decision Support System will be reviewed, with an emphasis on how the DSS could support the NWT Water Stewardship Strategy, other water management activities and water users in the NWT.	***Ricki Hurst, Terriplan Consultants***
2:00 – 2:30	**20. Open Forum Discussion – Emerging Trends and Applying Information in Support of Water Management and Stewardship**	***Facilitators & Participants***
2:30 – 2:45	**Health Break**	
Session 4: Moving Forward Together as Water Managers and Stewards		
3:30 – 4:00	**22. Moving Forward: An Aboriginal Perspective** Panel members will respond to a series of questions relating to water stewardship in the NWT.	***Tim Heron, Northwest Territory Métis Nation*** ***Arthur Beck, Northwest Territory Métis Nation*** ***Sonny MacDonald, Member MRBB*** ***Richard Binder, Inuvialuit Game Council***
4:00 – 4:30	**23. Open Forum Discussion – Moving Forward**	***Facilitators & Participants***
4:30 – 4:40	**24. Closing Remarks/ Adjournment**	***Facilitators***

APPENDIX C: POSTERS

1. The Expansion of Nahanni National Park: A Successful Collaboration between Parks Canada and the Dehcho First Nations
2. NWT Water Strategy Geographic Information System and Geodatabase model
3. Water and Beyond: Research Priorities of the NWT Board Forum
4. Health Canada's Chemicals Management Plan and You

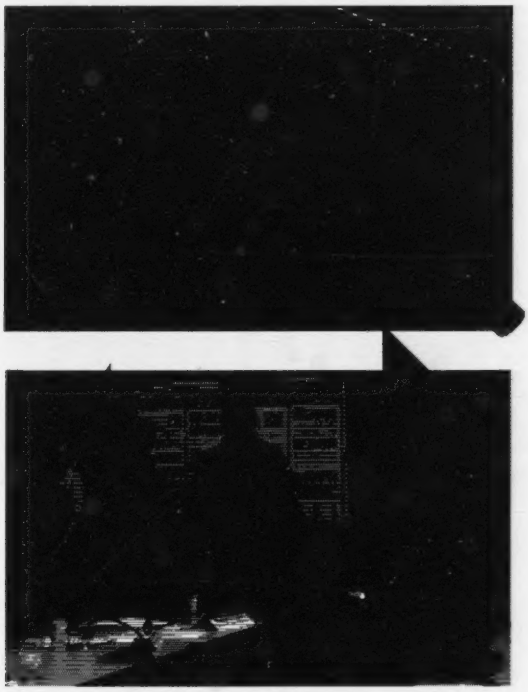

Figure 8: Participants looking at SCN posters

APPENDIX D: SPEAKER'S PRESENTATIONS

See separate PDF document at http://www.scnconference.ca/Appendix%20C%20-%20SCN09%20Presentations_June%2023%2009.pdf , which will be incorporated into the pdf report once finalized.